

Puget Sound Naval Shipyard Continues Industrial Energy Innovations

Facility Improvements Save Energy While Improving Productivity

OVER THE YEARS, the Puget Sound Naval Shipyard & Intermediate Maintenance Facility (PSNS&IMF) has implemented many facility improvements that save energy and even improve productivity.

Approximately 45 percent of the facility energy use for Navy Region Northwest can be attributed to PSNS&IMF, a tenant command of Naval Base Kitsap located in Bremerton, Washington.

PSNS&IMF has implemented a number of facility improvements to save energy and improve productivity.

The shipyard's mission of repairing and overhauling the Navy's fleet is energy intensive and industrial in nature. Standard facility energy improvements appropriate for office spaces may have little impact on the command's overall energy use. Shipyard specific energy improvements are needed for industrial energy savings. Over the years, PSNS&IMF has implemented the following facility improvements to save energy and improve productivity:

1. Automated doors

High speed automated roll-up doors open and close as forklifts approach.

2. Fluorescent lighting

Fluorescent lighting designed for mounting heights up to 80 feet in high-bay shop areas, provides improved light quality when compared to previous halide and sodium lighting, and uses half the energy. Fluorescent lights can be turned on and off as needed, while halide and sodium lights had to be left on to avoid long warm-up periods.

3. Electric motor driven fans

More efficient electric motor driven fans replaced many of the compressed-air movers used to ventilate spaces on ships in overhaul. They use a fraction of the energy and are quieter.

4. Compressed air drive mechanisms

Drive mechanisms for large forge hammers used in steel fabrication were changed from steam-driven to compressed air, saving considerable energy when the forge hammers are in standby.

5. Automated valves in water distribution lines

Exposed water distribution lines on piers and dry-docks are protected from freezing by automated valves that allow a trickle of water to flow during freezing temperatures.

6. Energy-efficient power supplies

Most welding machine power supplies were replaced with more energy-efficient models.

Striving for sustainability, the Naval Base Kitsap Energy Team in Bremerton continues to identify and implement energy improvements for the industrial infrastructure.

Boilers at the base's steam plant will undergo an upgrade that is scheduled for completion in summer 2015. The project involves recovering heat from the boiler's exhaust gases, using an energy recovery heat exchanger and pumping system, and pre-heating the boiler's feed water using the recovered heat.

The project also replaces the constant speed exhaust gas fan with a variable speed fan and motor. Driving the fan at reduced speed saves significant energy when operating at partial load. Boiler tubes were cleaned to improve heat transfer, and condensate tanks were insulated to retain heat from the returned condensate.

Because the 2,300-volt high-intensity street light fixtures were wired in series, repairs required shutdown of the entire string to replace lamps. The new light-emitting diode light fixtures use 480-volt power, require less maintenance, consume about half the energy, and will be individually wired. This project is scheduled for completion in the summer of 2015.

Smaller industrial energy initiatives can collectively add up to big savings. Some improvements recently completed or currently in construction include:



- Reducing steam distribution pressure in certain distribution lines during the summer period of low steam use
- Insulating welding rod storage ovens
- Sealing unused mezzanine roof ventilators
- Installing additional high speed roll-up doors
- Replacing rectifiers with energy-efficient models
- Adding controls to the cooling of rectifier power supplies and a metal parts degreaser
- Changing the heat source for parts cleaning dip tanks from steam to hydronic
- Replacing compressed air agitators in dip tanks with mechanical agitators
- Recovering waste heat from furnaces
- Recovering waste heat from compressors
- Replacing dampers on gravity vents
- Installing variable frequency drives on motors
- Repairing compressed-air leaks
- Improving daylight controls in shop areas with large windows

- Adding accessible switching for shop lighting systems
- Adding insulation

Additional projects are under development include steam trap replacements, retro-commissioning of building heating, ventilation and air conditioning controls, installation of more light-emitting diode lighting, improvement of photocell controls, installation of water-saving fixtures, and installation of a steam alternative in an inefficient steam distribution leg.

Achieving a steady drop in energy use over the long term in an industrial setting isn't easy. Many of the systems aren't covered in energy management text books, and most of them are considered mission critical. Industrial energy management requires a continuing commitment to evaluating energy-using processes, communicating with the personnel who do the work, and implementing improvements. ⚓

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Join SERDP & ESTCP for an Upcoming Webinar

Promoting the Transfer of Innovative, Cost-Effective & Sustainable Solutions

THE STRATEGIC ENVIRONMENTAL Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP) will continue offering their webinar series throughout 2015 to promote the transfer of innovative, cost-effective and sustainable solutions developed by both programs. The series targets end users, including practitioners, the regulatory community and researchers. The primary objective of the series is to provide these end users with cutting-edge and practical information from sponsored research and technology demonstrations in an easily accessible format at no cost to participants.

The webinars are held approximately every two weeks on Thursdays from 12:00 to 1:30 pm Eastern time. Each webinar features distinguished speakers from one of SERDP and ESTCP's five program areas:

1. Energy and Water
2. Environmental Restoration
3. Munitions Response
4. Resource Conservation and Climate Change
5. Weapons Systems and Platforms

Webinar dates and topics for the rest of the year include the following:

Following the completion of each live webinar, archives of the presentation and audio will be available online.

To view the complete schedule of upcoming webinars as well as to access archived files of past webinars, visit www.serdp-estcp.org/Tools-and-Training/Webinar-Series.

SERDP is the Department of Defense's (DoD) environmental science and technology program, planned and executed in partnership with the Department of Energy and the U.S. Environmental Protection Agency, with participation by numerous other Federal and non-Federal organizations. The program focuses on cross-service requirements and pursues solutions to the Department's environmental challenges while enhancing and sustaining military readiness.



ESTCP is DoD's environmental technology demonstration and validation program. Projects conduct formal demonstrations at DoD facilities and sites in operational settings to document and validate improved performance and cost savings. Demonstration results are subject to rigorous technical reviews to ensure that the conclusions are accurate and well supported by data.

For more information, visit www.serdp-estcp.org. 

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DATE	TOPIC
July 16, 2015	Watershed Assessment and Stormwater Management Optimization Tools
August 20, 2015	Characterization and Remediation in Fractured Rock Environments
September 17, 2015	Munitions Response: Water Geophysical Sensors
October 1, 2015	Hexavalent Chrome Elimination from Hard Chrome Surface Finishing
October 15, 2015	Remote Methods for Water Conservation
October 29, 2015	Assessment and Treatment of Contaminated Sediments
November 12, 2015	Munitions Response: Land Based Program Closeout
December 3, 2015	Emerging Contaminants: DoD Overview and State of Knowledge on Fluorochemicals and 1,4-Dioxane
December 17, 2015	Resource Conservation and Climate Change

U.S. Postal Service Launches Free Federal Trade-in & Recycling Program

BlueEarth Program Allows Defense Department Employees to Drop Their Recyclables in the Mail

DO YOU KNOW that the average American home has 24 used, unwanted electronic items? Products such as old computers, cell phones and other electronics are difficult to dispose of because they typically contain hazardous constituents such as lead, cadmium and mercury.

To simplify recycling of these items, the United States Postal Service (USPS) has launched the BlueEarth™ federal recycling program. This program allows participating government service employees to recycle their personal small electronics and empty printer cartridges through a simple three-step process.

Executive Order 13514, Federal Leadership in Environmental Energy and Economic Performance (2009) authorized the program, which was set forth in a Memorandum of Understanding between the USPS and the Department of Defense (DoD).

Proper disposal of personally owned electronic waste (e-waste) by service members and families living in military housing or aboard military vessels is the responsibility of the service member, unless disposal is otherwise addressed in the terms of a Public Private Venture housing contract. Disposal as municipal waste may be prohibited

by local regulations and should be discouraged even where local regulations permit landfill disposal of electronic waste.

Local recyclers and businesses may offer free electronics recycling and if so, DoD installations are encouraged to partner with them. If not, the new BlueEarth program provides an easy alternative. Personally-owned printer cartridges and small electronics such as cell phones, laptops, and almost any such item under 20 pounds can be shipped free of charge to a pre-authorized address for secure disposal by Clover Technologies, Inc. Hard drives will be erased via DoD data sanitization standards. (Note: This program is only for personally owned E-waste. Unwanted government property should be turned into the Defense Logistics Agency (DLA). If an item is damaged and unacceptable for disposal by DLA, your command will provide an alternative.

To participate, simply box up the item or items you'd like to dispose of, then go to www.fedrecycling.com.

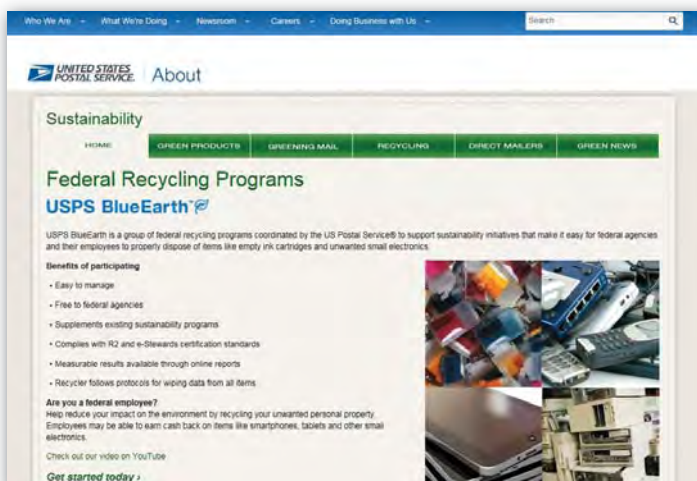
The BlueEarth program can even provide your office with measurable results through online reports.

To participate, simply box up the item or items you'd like to dispose of, then go to www.fedrecycling.com. After entering your address and a few details about your item, you can print out a mailing label, and either drop your item in a mailbox or schedule a pickup at your home, all via the same website.

It's easy and a great way to keep thousands of items out of landfills.

For more information about the BlueEarth program visit <http://blueearth.usps.gov>.

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CNO Environmental Research & Development Programs Release Annual Reports

First-ever LMR Report Joins Latest NESDI Year In Review Report

THE LIVING MARINE Resources (LMR) program and the Navy Environmental Sustainability Development to Integration (NESDI) program have released their annual reports to highlight each program's accomplishments in fiscal year 2014 (FY14).

The LMR program addresses the Navy's key research needs and transitions the results and technologies for use within the Navy's at-sea environmental compliance and permitting processes. Its goals include improving marine species impact analysis (including marine mammal take estimates), mitigation measures and monitoring capabilities. As the first report of a relatively new program (formed in 2012), the LMR 2014 report includes a summary of the program's history, along with its mission statement, an explanation of program structure and relative responsibilities of Navy research and monitoring programs, and an overview of how the LMR process works. It also provides a list of publications from 2013 and 2014 that were partially or fully funded by the LMR program.

The NESDI program's mission is to demonstrate, validate and integrate innovative technologies, processes, and materials; and to fill knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Fleet readiness. The NESDI report contains information on program funding and trends, as well as a detailed description of the program's process, including an overview of needs collected and the proposals gathered in FY14.

The LMR report includes two-page descriptions of the nine projects launched during FY14. These include:

- **Project 2: Integrated Real-time Autonomous Passive Acoustic Monitoring System (PAM)**

Packaging a system of low, medium and high frequency sensors and on-board digital signal processors into an autonomous underwater vehicle to support detection, classification, localization and tracking of baleen and beaked whales.

- **Project 3: Simple Performance-characterized Automatic Detection of Marine Mammal Sounds**

Building a database of specific, characteristic marine mammal audio signals that can be integrated into an existing PAM software package (Ishmael) to automatically detect and classify many marine mammal species.

- **Project 4: Demonstration of High-performance PAM Glider and Profiler Float**

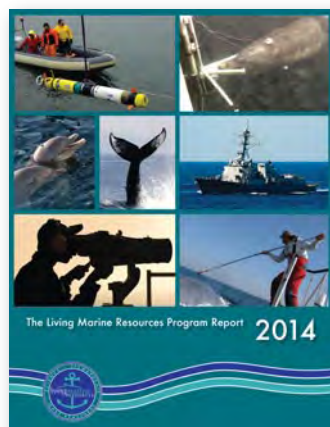
Demonstrating two autonomous PAM glider and float platforms that would allow the Navy to cost-effectively monitor marine mammals anywhere in the world including remote and non-instrumented training areas.

- **Project 5: Development of Automated Whistle and Click Detectors and Classifiers for Odontocete Species**

Building on existing acoustic data to create fully-automated and geographically-specific whistle and click classifiers for odontocetes, initially focused on three Navy range locations.

- **Project 6: Database and Metrics for Testing Automated Signal Processing for Passive Acoustic Monitoring**

Constructing marine mammal call datasets that can be used for development, testing and evaluation of automatic PAM signal processing systems that would support call detection and classification for each of the major naval training areas.



■ Project 7: Technology Demonstration for Navy Passive Acoustic Monitoring

Modifying the High-frequency Acoustic Recording Package (HARP), currently used on several Navy ranges, for new storage media that will boost data storage capacity, enabling sensors to be deployed continuously with infrequent servicing.

■ Project 8: Improving the Navy's Automated Methods for Passive Underwater Acoustic Monitoring of Marine Mammals

Adjusting algorithms in the Generalized Power Law (GPL) processor, a transient signal detector that has worked well with humpback whale data, to use with specific marine mammals. Call counts will be environmentally calibrated to improve density estimates.

■ Project 9: Electrophysiological Correlates of Subjective Loudness in Marine Mammals

Finding a correlation between specific features of auditory evoked potentials (AEP) and perceived loudness in marine mammals to define weighting functions will help to identify frequencies where auditory sensitivity is high and allow more individuals/species to be directly tested.

■ Project 10: The Effects of Noise on Marine Mammals

Developing a publicly accessible database of literature on marine mammal bioacoustics as part of a broader project to update a highly cited 1995 book on the effects of noise on marine mammals. Overall this project will consolidate two decades of marine mammal studies relevant to the Navy at-sea environmental compliance process.

The NESDI report profiles “new starts” for FY14 and discusses projects that were particularly successful over the course of the year in demonstrating the use of an innovative technology or integrating critical information to stakeholders across the Navy. Some notable accomplishments in FY14 include:

■ Project 440: Surface Cleaning of Drydock Floors

This project developed a method and vehicle for removing hazardous wastes from drydock floors.

For More Information

FOR MUCH MORE insights into the LMR program's recent investments, read our cover story “LMR Program Launches Efforts to Improve Marine Species Monitoring Techniques, Equipment & Analyses: New Projects Range from Hardware Upgrades to Improved Data Collection & Analysis Methods” in the spring 2015 issue of *Currents*. You can find an electronic copy of this article and browse the *Currents* archives at the Department of the Navy's Energy, Environment and Climate Change web site at <http://greenfleet.dodlive.mil/currents-magazine>.



■ Project 455: Modeling Tool for Navy Facilities to Quantify Sources, Loads, and Mitigation Actions of Metals in Stormwater Discharges

This team developed a modeling tool to help site managers develop and implement control practices to reduce metal concentrations in stormwater runoff.

■ Project 458: Advanced Non-Chromate Primers and Coatings

In an effort to remove hexavalent chromium from the waste stream, this team demonstrated and validated a new, state-of-the-art non-chromate primer and drafted an authorization letter to allow seven aircraft platforms to use it.

■ Project 459: Demonstration and Validation of Sediment Ecotoxicity Assessment Ring Technology for Improved Assessment of Ecological Exposure and Effects

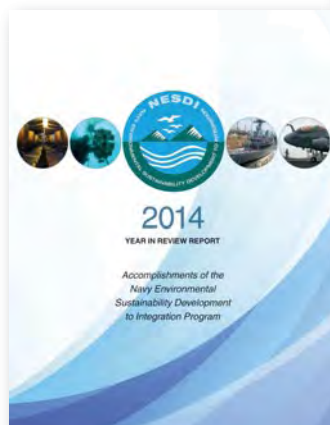
The team conducted a successful field stormwater demonstration of an integrated in situ bioassessment tool, the Sediment Ecotoxicity Assessment Ring, developed under a Strategic Environmental Research and Development Program project.

■ Project 464: Tertiary Treatment and Recycling of Waste Water

This project team demonstrated a manmade wetland for reclamation and reuse of wastewater. In FY14, the team received a permit allowing its use for subterranean irrigation at Marine Corps Recruit Depot San Diego.


■ Project 469: Validation of a Low Tech Stormwater Procedural Best Management Practice

This team validated that power vacuuming and high-pressure washing of impervious surfaces reduced average loading of copper and zinc on three San Diego piers by 75 percent and 40 percent, respectively.



Both the LMR and NESDI programs are sponsored by the Chief of Naval Operations Energy and Environmental Readiness Division and managed by the Naval Facilities Engineering Command.

To obtain a hard copy of either report, contact Lorraine Wass at 207-384-5249 or ljwass@outlook.com.

An electronic (pdf) version of the LMR report can be downloaded from www.lmr.navy.mil. An electronic (pdf) copy of the NESDI report can be downloaded from www.nesdi.navy.mil. 

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Tell Your Story in *Currents* • Due Date for Winter 2016 Issue Submissions is October 16, 2015

Have some good news about your energy or environmental program? Want to share it with others? *Currents* is the place to do it. *Currents*, the Navy's official energy and environmental magazine, has won first place in the Navy's Chief of Information Merit awards competition three times. Most recently, the magazine snagged an honorable mention in the 2014 competition. Its people like you and the stories you submit that make *Currents* the best magazine in the Navy.

So if you have a story that you'd like us to promote in our winter 2015 issue, submit your text and images by Friday, October 16, 2015. Any submissions received after this date will be considered for our spring 2016 issue.

You can get a copy of the *Currents* article template by sending an email to Bruce McCaffrey, our Managing Editor, at brucemccaffrey@sbglobal.net. This template has proven to be a tremendous asset in helping us edit and track your article submissions. Bruce is also available at 773-376-6200 if you have any questions or would like to discuss your story ideas. And don't worry. If writing isn't one of your strengths, we'll handle all of the editing necessary to get your submission into publishable form.

As a reminder, your Public Affairs Officer must approve your article before we can consider it for inclusion in the magazine.

Don't forget to "like" us on Facebook at www.facebook.com/navycurrents. *Currents'* Facebook page helps expand the reach of the magazine and spread the news about all the great work you're doing as the Navy's energy and environmental guardians.

Currents Deadlines

Winter 2016 Issue: Friday, October 16, 2015
Spring 2016 Issue: Friday, January 15, 2016
Summer 2016 Issue: Friday, April 15, 2016
Fall 2016 Issue: Friday, July 15, 2016

You can also refer to your *Currents* calendar for reminders about these deadlines.

What's Behind the "What's In Your Bay?" Poster

PERSONNEL FROM THE Navy Facilities Engineering Command (NAVFAC) Southwest and the Space and Naval Warfare Systems Center Pacific (SSC Pacific) commissioned a "What's in Your Bay?" poster to promote the Navy's efforts to protect the habitat in and around San Diego Bay as well as the green turtles and fishes that inhabit the bay. This beautifully illustrated poster (see next page) highlights four focus areas of the Navy's natural resource management efforts to ensure compatibility with its operations and the ongoing health of the bay and its inhabitants.

This beautifully illustrated poster highlights four focus areas of the Navy's natural resource management efforts.

1. Eastern Pacific Green Sea Turtles

A small population of federally threatened East Pacific green sea turtles has been living throughout San Diego Bay since at least the mid-1800s. Collisions with boats and accidental ingestion of trash, especially plastic bags and balloons threaten their survival. You can help recover San Diego Bay's green sea turtles by not polluting the bay with trash and obeying all posted boating speed limit signs.

2. Essential Fish Habitat

San Diego Bay's extensive eelgrass beds support a healthy marine ecosystem and help conserve a sustainable recreational fishery enjoyed by many anglers. Eelgrass, a type of marine plant, has been classified as Essential Fish Habitat under federal law, as these

plants provide many ecological benefits for fishes and invertebrates in the marine environment.

3. Sensitive Shorebirds and Seabirds

San Diego Bay is home to thousands of migratory and resident birds and waterfowl. Some of the sensitive bird species you may spot while on the bay include the federally endangered California Least Tern, federally threatened Western Snowy Plover, and the successfully recovered California Brown Pelican. These birds find no better home for nesting or feeding than San Diego's shorelines and nearshore coastal waters. Managing these sensitive bird species provides for the sustainability of natural resources, which supports the Navy's mission.

4. Fishing Regulations

California state fishing regulations require all anglers to have a fishing license for shore and boat fishing, with the exception of public piers in ocean or bay waters. It is your responsibility to comply so that this great sport can be enjoyed by future generations.

For an electronic copy of this poster, contact Jessica Bredvik at jessica.bredvik@navy.mil or 619-532-4182. And be on the lookout for the next poster from our NAVFAC Southwest and SSC Pacific colleagues—Life on the Edge—in a future issue of *Currents*. 🌿

About the Illustrations

ILLUSTRATIONS IN THE poster were created by Calene Luczo of Luczo Illustration & Design. Calene takes a multi-step process when designing renditions of biological species. She conducts research and collects hundreds of reference images to ensure that anatomy and physical characteristics are appropriate. Calene then hand-paints each species using watercolor paint and gouache (an opaque watercolor paint). She then scans all of the hand-painted images at high resolution and uses both Adobe Photoshop and Adobe Illustrator to complete her design and incorporate final copy and logos.

